Briefing note on animal breeding and genetics

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Mitigating the environmental impact of cattle and sheep: animal genetics and farmers' readiness for uptake

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Historically, adoption of breeding technologies by sheep and beef farmers has been slow and variable. This research aimed to understand why, and if the context of reducing methane emissions was likely to change adoption rates. Sheep and beef farmers around the UK were interviewed to find out if they would adopt a range of technologies to reduce methane emissions.* The farmers interviewed were less than convinced that breeding could be effective in reducing greenhouse gas emissions.

"I don't know. It would be very difficult because we're dealing with animals that have genetically been developed over several hundred years…and they're designed to eat something and process things a certain way. You can't change that very fast, you can tinker at the edges but you can't change that that fast." Commercial sheep and beef farmer

Estimated Breeding Values (EBVs)

- Some farmers make extensive use of Estimated Breeding Values (EBVs). Others will look at EBVs, but are mainly interested in appearance; yet others prefer to trust their own visual judgement rather than computer generated numbers.

- Some farmers associated EBVs with intensive production condition and feared that this performance would not be repeated in more demanding environmental conditions.

"For me, on this type of land, it's not going to be appropriate because, if I go and buy statistically the very best bull or sheep from a mart and I bring it here, it's just not going to perform because the food that I give it is going to be totally different food from what it's used to." Hill sheep and beef farmer

- Visually, main traits of interest to farmers related to measures of 'functional traits' such as leg length but sometimes also aesthetics

traits such as nicely curling horns in sheep (even when not showing animals).

"One gets a feel for what you feel like yourself. I want it to have decent bones and a good solid frame, otherwise there's no point in having it if it's going to get blown over in the wind." Hill sheep farmer

- Most farmers who didn't use EBVs, did not trust them. Some said they did not understand them. Others felt there was too much scope for inaccuracies in measurement.

"Anybody really could write what they want on them. This is a handicap, a lot of it is honest but you don't know what is and what isn't. A lot of this nonsense is masked by the computer programmes, EBVs and what have you." Beef cattle breeder

- Some farmers perceive that scientific breeding involves too narrow a selection criteria and potential side effects. Perceived infertility problems with high yielding dairy cattle were often quoted as evidence. This perception was combined with a general cynicism about scientific 'experts'.

- Economic benefits from faster growth rates, improved feed efficiencies or superior carcase quality are not immediately visible to farmers. In some cases (e.g. direct selling to consumers) slower growth rates are preferred as they are perceived to produce better quality meat or to provide continuity of supply for direct sale to consumer.

"Based on … trying to calve the cows in ten weeks but supplying the shop in 52 weeks… we were quite happy to let the stronger, earlier maturing cattle do just that, be stronger and earlier maturing, and they would be knocked down at the beginning of the annual cycle, and let the laggards catch up in their own time." Hill beef producer selling direct to consumers

- Even when wanting to use EBVS, sometimes this is not possible, e.g. there are no EBVs for mule sheep and pedigree beef herds tend to be small so buying direct from farm there is rarely more than 2-3 bulls to choose from.

Specific combining ability

- When talking about breeding choices, farmers frequently talked about individual combinations of animals rather than

population terminology preferred by breeding scientists.

"Sometimes you can get a small tup that actually, because of the maybe some sort of genetics when they hybridise with another animal, you can get interesting combinations that suddenly you get fantastic creatures coming out."
Organic sheep, beef and pig farmer

Using a breeding index designed to reduce methane emissions

- Farmers interviewed were generally willing to consider using such an index but were concerned about the overall impact both economically and in terms of the biology of the animals

"If you're getting better use of feed utilisation, in other words there's a financial advantage to us, obviously you'd be daft not to look at that. If it was an expense for no gain, you have to look at it totally differently."
Commercial sheep and beef farmer

Genetically modified and cloned animals

- When asked about willingness to use cloned or genetically modified animals, responses were mixed but underlying all responses was the belief that consumers would not accept them.

"That seems to be, whether correctly or not, that is a step too far for an awful lot of people. I think the general public aren't ready for that step yet, although as farmers we might be." Commercial sheep and beef farmer

***Research study details:**

42 in-depth interviews were conducted between Sept 2010-March 2011, of which 30 were with farmers and 12 with people working in the broader industry.

Farms were located from the South of England to the North of Scotland and included organic and conventional, upland and lowland, specialist breeders as well as commercial producers and producers selling liveweight, deadweight and direct to consumers.

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